

Patent Claims

1. Light illumination apparatus comprising at least one exposure head (12) and at least two light modulating arrangements (20),
5 each of said two light modulating arrangements (20) comprising a spatial light modulator (31, 32) and an associated light emitter arranged for illumination of an illumination surface (15) via said spatial light modulator (31, 32),
each of said two light modulating arrangements 20) being digitally controlled,
10 said apparatus comprising means for performing a relative movement between said at least one exposure head and said illumination surface (15) in at least one direction (x;y).
15 2. Light illumination apparatus according to claim 1,
wherein said at least two light modulating arrangements are arranged on the same exposure head (12).
20 3. Light illumination apparatus according to claim 1 or 2,
wherein said relative movement is a scanning movement.
25 4. Light illumination apparatus according to any of the claims 1-3,
wherein said relative movement is established by moving the at least one exposure head (12) relative to said illumination surface (15).
5. Light illumination apparatus according to any of the claims 1-4,
wherein said relative movement is established by moving said illumination surface (15) relative to the at least one exposure head (12).
30 6. Light illumination apparatus according to any of the claims 1-5,
wherein at least one exposure head (12) comprises two light modulating arrangements.

7. Light illumination apparatus according to any of the claims 1-6,
wherein said light modulating arrangements are arranged on at least two different
exposure heads (60, 61) and where said exposure heads (60, 61) perform scanning
movements over the illumination surface.
8. Light illumination apparatus according to any of the claims 1-7,
wherein said spatial light modulators being arranged so as to illuminate at least two
substantially separate sub-areas (SUB1, SUB2) of said illumination surface (15).
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9. Light illumination apparatus according to any of the claims 1- 8,
wherein said spatial light modulating arrangements (31, 32) being aligned so that the
rows of both light modulators are parallelly oriented.
- 15 10. Light illumination apparatus according to any of the claims 1 to 9,
wherein said spatial light modulating arrangements (20) being aligned so that the
neighboring rows of the at least two spatial light modulators are positioned
substantially so that the distance (DN) between the at least two neighboring rows of
the at least two spatial light modulators are substantially the same as the distance
20 (DR) between the rows of the individual light modulators.
11. Light illumination apparatus according to any of the claims 1 to 10,
wherein the “x-projection” (D1) of the distance between the centers of the at least
two spatial light modulators being less than 200 millimeters, preferably less than 150
25 millimeters, preferably substantially 120 millimeters.
12. Light illumination apparatus according to any of the claims 1 to 11,
wherein the “y-projection” (D2) of the distance between the centers of the two spatial
light modulators being less than 50 millimeters, preferably less than 35 millimeters,
30 preferably substantially 25.6 millimeters or 20.5 millimeters when applying SXGA,
and XGA respectively.

13. Light illumination apparatus according to any of the claims 1 to 12, wherein the distance between the centers of the two spatial light modulators being preferably substantially 122.7 millimeters or 121.73 millimeters when applying SXGA, and XGA respectively.

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14. Light illumination apparatus according to any of the claims 1 to 13, wherein said exposure head comprising cooling means (216, 217).

15. Light illumination apparatus according to any of the claims 1 to 14, 10 wherein each spatial light modulating arrangement comprising individual cooling means (216, 217).

16. Light illumination apparatus according to any of the claims 1 to 15, 15 wherein said substantially separate sub-areas (SUB1, SUB2) comprising neighboring surfaces of said illumination surface (15).

17. Light illumination apparatus according to any of the claims 1 to 16, wherein said at least one direction being substantially transverse to a relative movement of said illumination surface (15).

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18. Light illumination apparatus according to any of the claims 1 to 17, wherein said at least one direction establishing that an illuminated pixel on said illumination surface is illuminated by means of a least two light modulators of said spatial light modulator.

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19. Light illumination apparatus according to any of the claims 1 to 18, wherein said at least one direction establishing that an illuminated pixel on said illumination surface is illuminated by means of at least one modulator row of said spatial light modulator.

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20. Light illumination apparatus according to any of the claims 1 to 19,

wherein said exposure head being movable in at least two directions with respect to said illumination surface.

21. Light illumination apparatus according to any of the claims 1 to 20,
5 wherein said light emitter comprising a light source (210).
22. Light illumination apparatus according to any of the claims 1 to 21,
wherein said light emitter comprising at least one light emitting end of a optical guide
coupled to a light source.
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23. Light illumination apparatus according to any of the claims 1 to 22,
wherein said light emitter comprising a lamp.
24. Light illumination apparatus according to any of the claims 1 to 23,
15 wherein said light emitter comprising a LED matrix.
25. Light illumination apparatus according to any of the claims 1 to 24,
wherein said spatial light modulator comprising a DMD chip.
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26. Light illumination apparatus according to any of the claims 1 to 25,
wherein said spatial light modulator comprising a micro-mechanical transmissive
light modulator.
27. Light illumination apparatus according to any of the claims 1 to 26,
25 wherein said illumination surface comprising a printing plate.
28. Light illumination apparatus according to any of the claims 1 to 27,
wherein said illumination surface comprising a light sensitive material.
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29. Light illumination apparatus according to any of the claims 1 to 28,
wherein the exposure head is adapted for scanning in two transverse opposite
directions.

30. Light illumination apparatus according to any of the claims 1 to 29,
wherein the x-direction between centers of the spatial light modulating arrangement
is less than 150 mm, preferably less than 121 mm.

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31. Light illumination apparatus according to any of the claims 1 to 30,
wherein the x-direction between centers of the spatial light modulating arrangement
is substantially 0 (zero).

10 32. Method of illuminating an illumination surface (15),
whereby at least two light modulating arrangements (20) arranged on at least one
exposure head, each comprising a spatial light modulator (31, 32) illuminate the
illumination surface (15) by a scanning movement.

15 33. Method of illuminating an illumination surface according to claim 32,
whereby said at least two light modulating arrangements (31, 32) are arranged on the
same exposure head (30a).

20 34. Method of illuminating an illumination surface according to claim 32,
whereby said at least two light modulating arrangements (62,63) are arranged on
different free-running exposure heads (60, 61).

25 35. Method of illuminating an illumination surface,
whereby the illumination is performed by means of a light illumination apparatus
according to any of the claims 1-31.